

**REMARKS**

Independent Claims 1 and 14 have been amended so that the positions of the blades are defined as being fixed relative to each other. As shown in Figures 1 and 2 of the drawings, in one embodiment of the invention, the plurality of blades are attached to the frame. By moving the frame, the blades intercept the energy beam, and the exposure device can achieve blockage of the energy beam in a very short time. Unlike the prior art as discussed herein, the blades remain fixed relative to each other when the device is activated.

Claims 1-2, 10-11, 14-15, and 23-24 were rejected under 35 U.S.C. 102(e) as being anticipated by McCullough, U.S. Patent 6,097,474.

With respect to Claims 1-2 and 10-11, McCullough is said to disclose an exposure device having an illumination system for generating an energy beam and a shutter including a frame defining an aperture and a plurality of rectangular blades which are secured to the frame and parallel to each other and means for moving for the blades to block or to allow the energy beam through the aperture.

With respect to Claims 14-15 and 23-24, the method claims are said to be inherent in existence of the above apparatus.

Applicants submit that McCullough is not pertinent because it describes a device in which the blades move relative to each other as shown in Figures 3 and 4. This is in contrast to the claimed device wherein the blade positions are fixed relative to each other.

Claims 1 and 14 were rejected under 35 U.S.C. 102(b) as being anticipated by Nakamori, U.S. Patent 5,043,753.

Nakamori is said to teach a camera having a shutter blade device comprising all of the limitations as set forth in the claims. Although the prior art does not specifically disclose a claimed source of radiation, the Examiner asserted that this feature is seen to be an inherent teaching of that device and it is apparent that some type of radiation source must be present for the exposure device to function as intended.

Nakamori describes conventional iris-type camera shutter blade devices in which the shutters open and close by a mechanism wherein the blades move relative to each other. This is

entirely different from claimed invention wherein the individual blades are in a fixed position relative to each other.

Claims 4-9, 12-13, 17-22, and 25-26 were rejected under 35 U.S.C. 103(a) as being unpatentable over McCullough or Nakamori.

With respect to Claims 4-5, 8-9, and 12-13, McCullough or Nakamori is said to disclose a shutter for adjusting a beam of radiation in an exposure device comprising all basic structures as set forth in the instant claims except for the width of the blade as well as the cross sectional area of the radiation beam or a time period for opening and closing of the blades. However, it was concluded that it would have been obvious to select claimed parameters.

With respect to Claims 6-7 and 19-20, it was reasoned that while McCullough or Nakamori did not disclose the material of the blade as claimed, it would have been obvious to choose known materials. Even assuming arguendo that selection of the size, diameter, etc., of the components of the exposure device is a matter of design choice as implied by the Office Action, Applicants submit that given the fundamental deficiencies of both primary references, rejection of these dependent claims is not tenable.

Finally, Claim 3 was rejected under 35 U.S.C. 103(a) as being unpatentable over McCullough or Nakamori in view of Styrnol et al, U.S. Patent 6,252,935.

McCullough or Nakamori is said to disclose an exposure apparatus comprising substantially all the limitations of the instant claim. While McCullough or Nakamori does not expressly disclose the drive means for driving the blades including a solenoid which is enclosed in a vacuum case, it was reasoned that this structure is well known in the art and is evidenced by Styrnol et al.

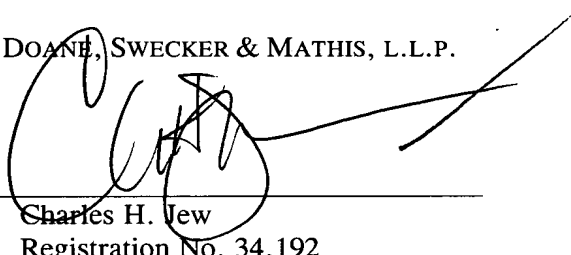
Applicants submit that even if the secondary reference describes the art as suggested by the Examiner, the secondary reference does not cure the deficiencies of the primary references for the reasons stated above.

For the foregoing reasons Applicants submit that the pending claims define novel and non-obvious subject matter. In the event that there are any questions concerning this amendment or the application in general, the Examiner is respectfully urged to telephone the undersigned attorney so that prosecution may be expedited.

Respectfully submitted,

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**MARKED UP VERSION OF CHANGES**

1. (Amended) An exposure device comprising:  
a source of radiation that generates an energy beam;  
a shutter that includes (i) a frame defining an aperture toward which the energy beam is directed and (ii) a plurality of blades that are secured to the frame; and  
means for rotating the frame of the shutter to cause the plurality of blades to intercept or allow the energy beam to travel through the aperture wherein the positions of the individual blades remain fixed relative to each other.
3. (Amended) The exposure device of claim 1 wherein the means for rotating the frame of the shutter comprise a solenoid that is encased in a vacuum compatible housing that entraps contaminants from the solenoid.
5. (Amended) The exposure device of claim 1 wherein the light beam is [asubstantially]a substantially collimated beam that has a cross sectional area of from about 5 cm<sup>2</sup> to 30,000 cm<sup>2</sup>.
10. (Amended) The exposure device of claim 1 wherein the means for rotating the frame of the shutter comprises:  
pivot means for pivoting the frame such that the plurality of blades rotates about an axis that is normal to the substantially planar surfaces of the plurality of blades; and  
drive means for moving the frame in a controlled manner (i) from an open position that allows the energy beam to travel through the aperture to a closed position that intercepts the energy beam and (ii) from the closed position to the open position.
14. (Amended) A method of patterning a substrate through controlled exposure of the substrate in a vacuum system which comprises the steps of:  
generating radiation comprising an energy beam;

controlling the exposure with an exposure device that comprises a shutter that includes (i) a frame defining an aperture toward which the energy beam is directed and (ii) a plurality of blades that are secured to the frame; and

rotating the frame of the shutter to cause the plurality of blades to intercept or allow the energy beam to travel through the aperture wherein the positions of the individual blades remain fixed relative to each other.

16. (Amended) The method of claim 14 wherein the exposure device includes means for rotating the frame of the shutter that includes a solenoid that is encased in a vacuum compatible housing that entraps contaminants from the solenoid.

23. (Amended) The method of claim 14 wherein the exposure device includes means for rotating the frame of the shutter that comprises:

pivot means for pivoting the frame such that the plurality of blades rotates about an axis that is normal to the substantially planar surfaces of the plurality of blades; and

drive means to move the frame in a controlled manner (i) from an open position that allows the energy beam to travel through the aperture and a closed position that intercepts the energy beam and (ii) from the closed position to the open position.